

# CS422 - Programming Language Design

Typing, CPS Transformation, Denotational  
Semantics and Logic Programming Homework

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This homework assignment has five problems and is due on

*Friday, December 8, at midnight.*

For this homework, please see the attached notes and files.

### **Problem 1: Type Checking**

Do either exercise 2 (page 101) or exercise 3 (page 102) from the attached notes on types – these replace the previously tagged “incomplete” notes. If you do both you may get extra-credit (contact me for details on extra-credit).

### **Problem 2: Type Inference**

Do either exercise 5 (page 112) or exercise 7 (page 118) from the attached notes on types. If you do both, you may get extra-credit.

If you want more extra-credit, also do exercise 6 (contact me for details and documentation).

### **Problem 3: CPS Transformation**

Complete the Maude definition of the CPS transformation that is partially provided in [fun-CPS.zip](#).

### **Problem 4: Denotational Semantics**

Give proof sketches (i.e., skip the boring details but put enough info to convince me that you understood these results) to both HW exercises in the lecture notes on Denotational Semantics (one on page 29 and the other on pages 32-33). For the second, refer only to the SOS semantics that we discussed at the beginning of the class – i.e., ignore the equational semantics part of the problem as

well as the proof sketch provided in the lecture notes (they do not apply to the SOS part).

## Problem 5: Logic Programming

Add cut “!” to the definition of mini-Prolog discussed in class.